

# Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/US05/010649

International filing date: 31 March 2005 (31.03.2005)

Document type: Certified copy of priority document

Document details: Country/Office: US  
Number: 60/558,076  
Filing date: 31 March 2004 (31.03.2004)

Date of receipt at the International Bureau: 12 May 2005 (12.05.2005)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)



World Intellectual Property Organization (WIPO) - Geneva, Switzerland  
Organisation Mondiale de la Propriété Intellectuelle (OMPI) - Genève, Suisse

1315382

# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

*April 28, 2005*

**THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE.**

**APPLICATION NUMBER: 60/558,076**

**FILING DATE: *March 31, 2004***

**RELATED PCT APPLICATION NUMBER: *PCT/US05/10649***



Certified by

Under Secretary of Commerce  
for Intellectual Property  
and Director of the United States  
Patent and Trademark Office

033104



17707 U.S. PTO

Please type a plus sign (+) inside this box →

+

Approved for use through 10/31/2002. OMB 0651-0032  
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

**PROVISIONAL APPLICATION FOR PATENT COVER SHEET**

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

2154 U.S. PTO  
60/558076

033104

INVENTOR(S)					
Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)			
John David	Rooney Biro	32 Berkeley Circle, Basking Ridge, NJ 07920 42 Cayuga Avenue, Rockaway, NJ 07866			
<input type="checkbox"/> Additional inventors are being named on the _____ separately numbered sheets attached hereto					
TITLE OF THE INVENTION (280 characters max)					
METHOD OF MANUFACTURING OF LOW ODOR PACKAGING MATERIALS					
Direct all correspondence to: CORRESPONDENCE ADDRESS					
<input checked="" type="checkbox"/> Customer Number		25900		→ Place Customer Number Bar Code Label here	
OR Type Customer Number here					
<input type="checkbox"/> Firm or Individual Name		Sun Chemical Corporation			
Address		222 Bridge Plaza South			
Address					
City	Fort Lee	State	NJ	ZIP	07024
Country	USA	Telephone	201-224-4600	Fax	201-224-2439
ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/> Specification Number of Pages		2		<input type="checkbox"/> CD(s), Number	
<input type="checkbox"/> Drawing(s) Number of Sheets				<input type="checkbox"/> Other (specify)	
<input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76					
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT (check one)					
<input type="checkbox"/> A check or money order is enclosed to cover the filing fees				FILING FEE AMOUNT (\$)	
<input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number				19-4968	
<input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.				\$160.00	
The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.					
<input checked="" type="checkbox"/> No.					
<input type="checkbox"/> Yes, the name of the U.S. Government agency and the Government contract number are: _____					

Respectfully submitted,

SIGNATURE

TYPED or PRINTED NAME Sidney Persley

TELEPHONE

201-224-4600 Ext. 322

Date

03/31/04

REGISTRATION NO.

34,898

(if appropriate)

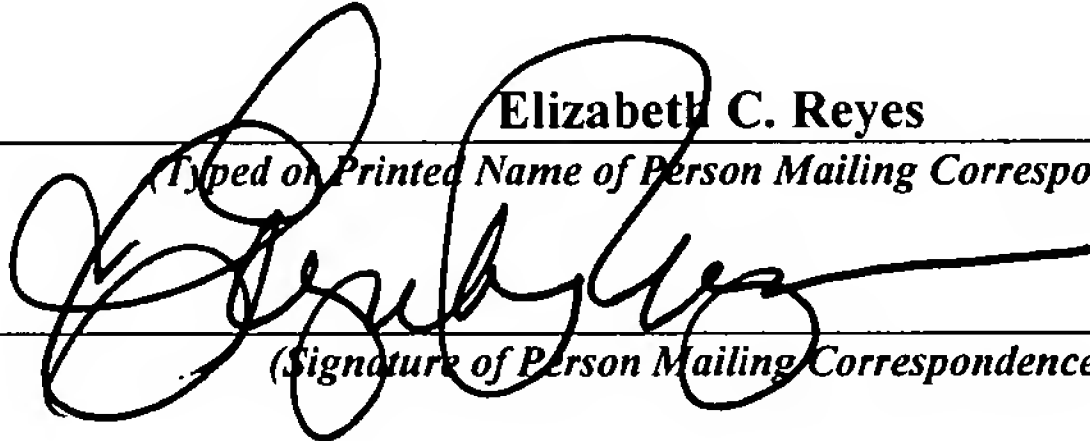
Docket Number:

C-622

**USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT**

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C.

P19LARGE/REV05

<b>CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10)</b>			Docket No.
Applicant(s): J. Rooney & D. Biro			C-622
Serial No.	Filing Date	Examiner	Group Art Unit
Invention: Method of Manufacturing of Low Odor Packaging Materials			
<p>I hereby certify that the following correspondence:</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"><p>Provisional Patent Application</p></div> <p style="text-align: center;"><i>(Identify type of correspondence)</i></p> <p>is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on</p> <div style="display: flex; justify-content: space-between; align-items: flex-end;"><div style="text-align: center;"><p><u>March 31, 2004</u></p><p><i>(Date)</i></p></div><div style="text-align: center;"><div style="display: flex; align-items: center; justify-content: center;"><div style="margin-left: 10px;"><p>Elizabeth C. Reyes</p><p><i>(Typed or Printed Name of Person Mailing Correspondence)</i></p><p><i>(Signature of Person Mailing Correspondence)</i></p><p><b>EL615312417US</b></p><p><i>("Express Mail" Mailing Label Number)</i></p></div></div></div></div>			
<p><b>Note: Each paper must have its own certificate of mailing.</b></p>			



17707 U.S. PTO  
033104

## INVENTION RECORD

SUN CHEMICAL

STATUS OF INVENTION		INVENTOR(S) John Rooney and David Biro		CASE NO. C - 6 2 2
		ORIGIN		
CONCEPTION DATE		DESCRIPTIVE TITLE Method of manufacturing of low odor packaging materials.		
DATE OF 1st USE OR SALE		BRIEF ABSTRACT OF INVENTION <i>This invention describes a process of producing low odor packaging materials out of plastic film or paper, solvent or water based printing inks and electron beam curable coating utilizing UV lamp and EB curing unit.</i>		
1st WRITTEN DESC. DATE	WHERE RECORDED? R2888-114, 116-117	DATE PREPARED 3/30/2004	DATE RECEIVED	RATING

DETAILED DESCRIPTION OF INVENTION (SEE INSTRUCTIONS REVERSE SIDE)

### Background of Invention

This invention relates to a process of producing food packaging materials utilizing solvent or water based liquid inks and electron beam coating, serving for ink protection and gloss enhancement.

### Prior Art

Cryovac's patent US 6 528 127 is teaching a manufacturing process of food packaging materials comprising of printing with solvent based inks over plastic film, drying the inks and then applying EB curable, protective and decorative coating. In this process, excessive amount of residual solvent is typically trapped in the ink under EB coating causing excessive odor of the packaging material. Additionally, since drying rate is significantly different over multiple ink traps, cure and friction characteristics of the finished packaging material are very non-uniformed throughout the printed image. This, in turn, can cause problems with processing the packaging material in the filling lines and higher extractables from the cured EB coating. For example, a job printed at Performance Packaging with three solvent based inks on the polyethylene film and over-printed with EB coating, has the following cure pattern – coating over PE film – 30 MEK rubs, coating over white – 8-10 MEK rubs, coating over yellow, over white – 3-4 MEK rubs, coating over black, over, yellow and over white – only 1 MEK rub.

### Summary of Invention

This invention describes a process of producing low odor packaging materials that requires printing with solvent or water based printing inks, substantially free of curable functionality, over the plastic film or paper, drying the inks, exposing the printed image to UV lamp, applying electron beam curable coating over the inks and curing it under an exposure to EB irradiation. This process allows a low odor packaging material with uniform friction characteristics and reduced microbial content.

### Advantages Over Prior Art

Introduction of UV lamp in the process of producing EB coated packaging material has several distinct advantages over the Cryovac's patent. Heat, generated by UV lamps helps to remove residual solvent which otherwise trapped under EB coating causing excessive odor of the packaging material. Also, trapped solvents negatively affect cure and COF of EB coating. Additional benefit of UV exposure is antimicrobial action of UV light that reduces microbial count in the packaging material, extending shelf life of packaged food.

## Description of Invention

### Example 1:

A 75 micron thick opaque polyethylene film was coated with a solvent-based red ink (nitrocellulose / polyurethane based) and dried using a hot air gun. Thereafter, a thin protective layer of electron beam curable coating was applied over the red-coated film with a #3 Meyer bar. This was electron beam cured at 3 Mrads, 100kV acceleration voltage and less than 200ppm oxygen. The resultant glossy film has a 60 degree reflective gloss of 71-73% and had a solvent resistance of 17-20 MEK (methyl ethyl ketone) double rubs. The face to face coefficient of friction was 0.39-0.40 static / 0.31-0.32 kinetic as measured on a TMI (Testing Machine Instruments, Amityville, NY, model 32-06) slip friction tester. The residual solvent as measured by GC-headspace was 593 mg/ream.

### Example 2:

A 75 micron thick opaque polyethylene film was coated with a solvent-based red ink (nitrocellulose / polyurethane based) and dried using a hot air gun. Immediately thereafter, the coated film was subjected to 250 mJ/cm<sup>2</sup> of ultraviolet radiation (UV). A thin protective layer of electron beam curable coating was applied over the red-coated film with a #3 Meyer bar. This was electron beam cured at 3 Mrads, 100kV acceleration voltage and less than 200ppm oxygen. The resultant glossy film has a 60 degree reflective gloss of 71-73% and had a solvent resistance of 24-32 MEK (methyl ethyl ketone) double rubs. The face to face coefficient of friction was 0.39-0.40 static / 0.31-0.32 kinetic as measured on a TMI (Testing Machine Instruments, Amityville, NY, model 32-06) slip friction tester. The residual solvent as measured by GC-headspace was 402 mg/ream.

Table A:

	MEK rubs	Residual solvent	CoF	60° Gloss
Example 1 (no UV)	17-20	593 mg/ream	0.39-0.40 / 0.31-0.32	71-73
Example 2 (UV)	24-32	402 mg/ream	0.39-0.40 / 0.30-0.31	71-73

### **Main Claims**

1. A process of producing food packaging material comprising of printing on plastic film with liquid inks substantially free of curable functionality, drying them, exposing inks to ultra-violet irradiation, applying EB curable coating over the ink and curing coating under electron beam exposure.
2. A process of claim 1 one where an ink is solvent based.
3. A process of claim 1 one where an ink is water based.
4. A low odor packaging material, produced according to claim 1 with residual solvent remaining after UV exposure less than 500 ppm total.
5. A packaging material, produced according to Claim 1 with minimum cure of EB coating, regardless of number of trapped colors, that is not less than 5 MEK rubs.